Characteristics of Market for Natural Beef in Colorado and Northern New Mexico

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March 2002

Submitted to *Journal of Food Distribution Research*

This study was funded by the USDA, Rocky Mountain Farmers Union, Rocky Mountain Beef and Rocky Mountain Pork, with additional funding for graduate student assistance and operating support from the Colorado Experiment Station. This paper benefited from the thoughtful comments from participants in Department of Agriculture and Resource Economics seminars at Colorado State University and Western Agricultural Economics Association meetings.

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Abstract:

The objective of this study is to identify those consumers with the highest willingness to pay and identify which properties of 'natural meats' are most important to these consumers. Findings show that consumers are willing to pay a higher percentage premium for natural ground beef than for natural beefsteak. We also categorize respondents using the estimated likelihood of paying a premium for natural beef to compare and contrast how several variables differ among potential customers Several demographics (age and income), as well as shopping behavior and types of meat purchased, are significantly associated with those willing to buy at a premium.

Introduction

Prodigious growth in the organic and natural foods sector during the 1990's (Greene, et al, 2001; Roper ASW, 2001) has led livestock producers to consider these markets as possible alternatives to the low margins received in commodity (Wheatly, 2001; Roosen et al, 2001; McGarry Wolf and Thulin, 2000). Following this trend, two Colorado producer cooperatives decided to investigate the feasibility of marketing their livestock as 'naturally produced' and 'locally produced'. One part of the feasibility analysis is identifying which consumers are willing to pay a premium for these meats, and what attributes of natural meats are most important to them. A second is estimating the size of premiums various consumers are willing to pay. In this paper, we are mainly interested in characterizing respondents who are most likely to pay a premium for natural beef. How do these respondents differ demographically and in terms of the importance they attach to attributes that define beef as 'natural?'

Kotler and Armstrong (1994) outline the value of market segmentation, by socioeconomic or psychographic variables, as a way to differentiate consumer behavior and needs. Accordingly, we segregate respondents according to their estimated likelihood of paying a premium for 'natural' beef in this study. These groups are then sorted by their probabilities of purchase into quintiles ranging from the most to least likely. Comparing the conditional variable means across these quintiles provides a nice baseline to target potential consumers based on their prevalent demographics, relative concerns about production practices (including environmental and animal treatment), shopping behavior and past natural meat purchases. First, it is important to review previous literature that guided the development of this study.

The Market for Organic Food: An Overview of Recent Research

Greene, et al (2001) present a nice summary of growth in the organic market since the late 1980's. Most studies from the early 1990's were quite 'regional' or even local in scope. Outside the economics literature, a number of surveys by marketing firms or public opinion surveys did have large, national samples. For example, Roper ASW (2001), The Packer (1998), FMI/Prevention (1997), and FMI (2000) gave evidence of consumer participation in the organic market and attitudes toward potential attributes of organic/natural foods. These studies chronicle the growth of the market as well as regional differences.

Thompson (1998) compiled a survey of recent organic demand studies. At the time, he noted the relative sparseness of evidence relating demographics to consumer willingness to pay a premium for organic foods. Misra, Grotegut and Clem (1997) found that willingness to buy pork treated with the hormone pST was correlated with age, gender, education, marital status, household income and concern about pST. Nayga (1995) analyzed the 1992 Consumer Expenditure Survey by the BLS and found that family size, age and income all had significant positive effects on demand for ground beef and steak.

Baker and Burnham's (2001) survey of research on food safety concerns showed similarly mixed results with respect to demographics. Similarly, Lusk (2001) found consumer food safety concerns to be a more significant than demographics in determining willingness to pay for nongenetically modified corn products. Finally, in a study on genetically modified foods, Baker and Burnham (2001) found that risk aversion,

information, and opinion had more explanatory power than sociodemographics, and clustered consumers into three groups based on whether branding, safety or price was an individual's most important factor.

Following Rodgers (1995), Hartmann (1996) used clustering techniques to form groups of consumers according to the extent to which they have 'adopted' organic/natural foods: True Naturals; New Green Mainstream; Young Recyclers; Affluent Healers; Overwhelmed; Unconcerned. This approach is sometimes referred to as 'psychometrics,' and relies on defining clusters that can be reached through particular media channels or organizations. Van Ravenswaay and Blend (1997) also use psychometric categories in their work on ecolabeling. The marketing relevance of clustering is obvious, and our study seems to suggest some psychometric approach may be best, or at least, will complement the sociodemographic findings.

Taken together, the above studies suggest that demographic variables are only weakly related to consumer participation in the organic/natural food market. In particular, there appears to be at least a bimodal distribution of frequency of participation over income (Sparling, et al, 1992; Thompson, 1998). Other variables like gender, education, and family size show inconsistent patterns with organic purchases over various studies (McGarry Wolf et al, 2000; McGuirk et al, 1990; Misra et al, 1997).

Determining the Importance of Organic/Natural Food Attributes

Consumers purchase products based on their tangible and intangible attributes in order to maximize utility (Lancaster, 1971), yet it is often difficult to determine the absolute and relative value consumers place on different attribute bundles. For our

purposes, attributes of 'natural' meats can be grouped into several related, but distinctive categories: those that apply to personal health (no use of antibiotics or artificial hormones in production), those that apply to environmental concerns (production methods preserving wildlife or stream habitats), and others (humane treatment of animals, production in local area, and aging of meat).

A 1990 study by McGuirk, Preston and McCormick provided a cluster analysis that described target markets for products based on food safety concerns. Of three clusters, two were highly concerned about health risks (additives and preservatives, nitrites, pesticide residues, antibiotics and hormones). These amounted to 76% of the sample, but about half of these were also very concerned about price.

Van Ravenswaay and Blend (1999) used both personal safety and environmental concerns as dummies in their quantity regression, finding only the latter to be significant. Roosen et al (2001) used consumer attitudes toward health related attributes of beef as explanatory variables in regressions that explained preferences for labeling in France, Germany, and the United Kingdom. Hormones and antibiotics were at or near the top of the list of concerns in all three markets. In a study on apples, Loureiro et al (2001) found eco-labeling strategies may face complex challenges in the marketplace, as the type, quality and alternative niches competing for consumer interest and business may affect demand for environmentally friendly products.

Hurley and Kliebenstein (1999) used experimental auctions to study willingness to pay for environmental attributes of pork production. Results indicated that 62% of participants were willing to pay some premium. For the most environmentally friendly packages, participants who were willing to pay would pay a 37% premium.

Methods to Analyze Organic/Natural Demand

A standard reference for models involving estimation of econometric models of discrete choice is Greene (2000). It is common practice to specify an underlying utility function, and to define choices between two or more discrete alternatives in terms of an observable index function(s) that represents a discrete choice. Estimated functions are then said to express the probability that a particular respondent would choose an alternative (index=1), given the values of a set of explanatory variables. In practice, it is common to elicit responses on likert scales and include them as explanatory variables, and demographic variables are often represented by dummy variables.

Van Ravenswaay and Blend (1999) apply both a recursive probit and tobit to 972 responses from a national telephone survey. They a applied a Fin-Schmidt (1984) test which supported the probit over the tobit model. Their goal was to estimate demand curves, whereas our goal was to estimate market share of particular types of meat between natural and conventional. Roosen et al (2001) apply both an ordered probit and double-bounded logit in their study of European consumer willingness to pay for labeling of meat. Thompson and Glaser have recently accessed scanner data to estimate demand functions for organic baby food (2001), frozen vegetables (1999), and beverage milk (2000) by incorporating prices for substitutes and quantities purchased.

Study Design and Methods

Since 'natural' meats were not widely available to consumers, it was necessary to conduct a market survey asking respondents what they would pay if such products were

available, a common industry practice. In fact, there exist panels of consumers maintained by marketing firms that specialize in such surveys, such as National Family Opinion Inc (NFO), who was contracted to deliver this survey to their household panel.

One advantage of using a 'panel' is the guarantee of a high rate of return (generally above 60%) from a survey sent to a balanced sample of households. A second advantage is that a balanced sample is demographically more representative than one that depends on intercepting the consumers either in person, or by telephone. Furthermore, detailed demographic data are returned for all households—those responding to the survey as well as those not responding. With this information, it is possible to test whether there is a significant difference between respondents and non-respondents. This is a simple test to check whether there is 'selection bias.' Selection bias exists when those responding differ from those not responding in ways that skew survey results.

Study Area

The geographic area included in this study (Colorado and Northern New Mexico) was defined by proximity to the livestock producer cooperatives that funded this project. Two major urban areas are included: the Colorado Front Range includes the urban areas of Colorado Springs, Denver, Boulder and Fort Collins; Northern New Mexico includes both Albuquerque and Santa Fe.

Design and Testing of Surveys

A questionnaire was designed to determine what consumers felt about the special qualities of naturally produced meats. In this context, 'naturally produced meats' were

defined as coming from, "animals raised using sound grazing practices with no antibiotics or hormones, and never confined to small or crowded pens." This description already fits the practices of many members of the cooperatives. In addition, the cooperatives were interested in whether consumers were willing to pay a premium for locally or regionally produced meat, and whether consumers differentiated between 'naturally produced' and 'organically produced meats.' More importantly, they wanted to better understand the value in promoting these practices.

With a preliminary questionnaire in hand, focus groups were held in each of the three regions to determine whether survey questions were understood, and whether there were other questions which should be asked. In the process of doing these focus groups, we decided to include questions about freezer beef based on participant interest.

Brief Description of Surveys

Surveys sent to respondents had three sections. First consumers were asked questions to determine where they usually bought their meat, how often they bought beef and pork, which cuts they bought most frequently, whether they ever purchased natural beef, their reasons for buying/not buying natural beef, their assessment of the quality of natural beef, and how much their family spends at grocery stores in an average week.

After completing the first section, respondents were given a description of "naturally produced meats," and asked to assume that they could trust labels. They were then asked to imagine themselves before a meat counter where they could purchase either 'natural' or 'regular' meat. They then answered four questions designed to gauge their price willingness to pay a premium for the natural product.

Please imagine that you are at the counter where you usually buy fresh meat. Two types of meat are available as both regular and labeled as naturally produced. The naturally

produced meat is from animals born and raised within 250 miles of where you live. The meats are displayed identically; their color, fat and size are exactly the same.

Ground Beef - *Regularly Costs $1.69/lb*

Cost Per Lb.	$1.70	$1.89	$2.09	$2.29	$2.49	$2.69	$2.89	$3.09	$3.29	$3.49	$3.69
a) Reasonable to Pay	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b) Begin to be Expensive	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c) Too Expensive	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Respondents were then asked to specify three prices for each product: one they felt was 'reasonable; one they felt 'begins to be expensive;' and finally, one that is 'just too expensive.' This results in an ordered set of three prices for each respondent. The prices correspond to a lower bound and an upper bound for the respondent's willingness to pay a premium, and an intermediate point representing a proxy for indifference.

Section three asked whether anyone in the respondent's household hunted large game; whether their household used a freezer or locker to keep large quantities of meat; and whether they would consider buying a quarter or side of natural beef. This section is not explored in this study, but will be explored in future research.

Respondent Data

Surveys were sent to 2430 households and 1474 were returned. After elimination of unusable returns, there were 1370 observations—a usable return rate over 55%. Use of the NFO panel allows us to statistically test for systematic differences in the demographics of different groups. Tests were run to see if demographics of respondents were significantly different from the demographics of the 2430 households. The tests were performed with the null hypotheses that the difference in means of household size,

income level and a lifestage variable were zero. The null hypothesis for household size was rejected but it was not rejected for income and lifestage.

Attribute Ratings

Figure 1 shows the average rating for each attribute, and given past research, it is not surprising to see that *no use of hormones* in meat production was rated highest in absolute value, although several production practices are also rated highly.

Past Purchases of Natural Beef

For the full sample, more than sixteen percent of respondents had tried natural beef in the past, and 1.5 percent ate natural beef weekly in the past six months, 4.6 percent ate it monthly and 9.7 percent ate it less often than monthly. On average, respondents who purchased natural beef in the past rated all production characteristics higher than the rest of the sample. These respondents were also willing to pay a higher premium for natural ground beef and steak on average.

Source of Meat Purchase

An overwhelming majority (87.7%) of respondents indicated that they did most of their meat shopping at the supermarket. However, 14.3 percent of respondents indicated that they purchased some of their meat from a *meat shop*, and nearly 10% reported buying at least some of their meat from producers. These results are consistent with USDA estimates for 1998 (ERS). The few differences can most likely be attributed to the fact that this survey focused on meat shopping rather than all grocery purchases.

Willingness to Pay Data

Faced with a question of what constitutes a reasonable premium to pay for a natural meat product, a significant proportion of respondents marked 'none,' in which case their willingness to pay was zero, and they skipped the particular willingness to pay question. Such respondents amounted to 13% of respondents for the ground beef sample, and 31% in the case of steak. The actual percentages of respondents reporting willingness to pay each premium are reported in figure 2 for ground beef and figure 3 for steak. Note that each figure contains two curves: one for all respondents and one for respondents who reported having bought natural beef previous to the study.

Statistical Analysis

In this study, the main objective is to simply distinguish between those respondents who would pay at least a 10% premium and those who would not. For each respondent, we use the intermediate price ("just begins to be expensive") as an estimate of individual respondent's 'break point,' beyond which the probability of paying a premium is significantly reduced. Thus, for individuals whose intermediate premium is below 10%, the willingness to pay a premium index function is set equal to zero. Otherwise it is set equal to 1.

Estimating Likelihood of Willingness to Pay a Premium

Logit regressions were run to estimate likelihoods/probabilities that each respondent would pay at least a 10% premium for natural ground beef and for natural steak. Explanatory variables included are described in Table 1. Based on earlier studies, we hypothesized that a high rating of importance on natural beef attributes should be positively related to the likelihood that a respondent would pay a premium. Similarly, it

was expected that age, education, and income should be related to the likelihood of paying a premium, negative in the case of age and positive in the case of the other two variables. It was also expected that respondents who had bought beef in specialty shops or in natural food stores would be more likely to express a willingness to pay a premium for natural beef.

Using Estimated Likelihoods to Identify the Best Prospective Customers

A model that identifies the consumers most likely to pay a premium for natural beef gives producers and retailers information to more effectively direct products and advertising. If "best prospects" can be effectively distinguished by demographics or psychometrics, advertising messages can be tailored to reach consumers with those characteristics. Likewise, if certain attributes of natural beef are identifiable as most important to this audience of "good prospects," then contents of advertising messages can be tailored to emphasize those attributes. McKenzie (2001) made use of logit analysis of consumer willingness to pay for organic fresh produce in order to identify good prospects in just this way. In the following section we present a similar treatment of our results for natural ground beef and natural steak.

Logit analysis used demographic information, shopping behavior information, and natural meat attribute ratings to estimate probabilities that each respondent would report a willingness to pay at least a 10% premium. Respondents are then sorted by their estimated probability of willingness to pay a premium. Finally, market segments were formed by dividing respondents into groups based on their estimated probability ranges

These groupings are useful categories to conduct comparative analysis of mean values for explanatory variables. Of most interest are the quintiles with high probabilities

of consuming natural beef. The associated means will give a picture of important and disparate demographics and attitudes toward natural beef attributes.

Results of Statistical Analysis

Both ground beef and steak models predict over two thirds of the responses correctly, but the ground beef model has fewer significant explanatory variables. This may indicate two distinct market segments, with different underlying preferences among their target markets. In general, families with children are likely to consume more ground beef than steak, and yet ground beef is often perceived to be less safe than steak (Pollan, 2002). Support for this explanation is found here by comparing estimated coefficients for the three dummies corresponding to families having children. In the hamburger equation, all three have positive (though not very significant) coefficients, and in the steak equation, all have negative (but not significant) coefficients.

Age seems to relate significantly in the steak equation: three out of four dummies for older households are significantly negative. Education failed to be significant in either equation, not surprising considering the inconsistency of past results.

Income dummy variables have positive and significant coefficients in both equations. The reference income category is "income below $15,000." Therefore in the steak equation we see that respondents from all other categories are significantly more likely to pay a premium than the lowest income respondents, an expected result. In the ground beef equation there is a somewhat more interesting result in that only those coefficients for respondents with incomes above $30,000 are significantly positive.

Disappointingly, none of the attribute variables were significant, and few even approached significance. Remarkably, the attribute most often identified as very important, hormones, shows a negative sign in the steak equation even though mean ranks among those willing to pay a premium are generally higher in descriptive statistics.

Finally, dummy variables corresponding to sources of meat supply were mostly insignificant. The 'most meat bought from supermarket' variable (SMKT1) was significantly positive in the ground beef equation[5]. One would expect that respondents who report purchasing most of their meat in natural food stores would be significantly more likely to pay a premium for natural beef, but even this dummy (NAT1) was insignificantly positive in each equation[6].

Classifying Respondents by Likelihood of Willingness to Pay

Explanatory variables for each respondent were used to assign an estimated likelihood, then translated to a probability of paying a premium for natural ground beef, and this process was replicated for natural steak. Then the data was sorted into probability quintiles: 0-20% (Quintile I), 20-40% (Quintile II), 40-60%(Quintile III), 60-80% (Quintile IV) and 80-100% (Quintile V).

Means of the descriptive variables for each quintile were calculated. These quintiles do not have equal sample sizes, as quintiles are defined in terms of probabilities rather than numbers of respondents. The probability quintiles are presented numerically in Table 3 and two sample target segments, in this case those consumers most likely to

[5] The reference dummy in this case would be those respondents with no prominent shopping choice.

[6] Lack of significance on so many important explanatory variables is disappointing. A possible explanation is multicollinearity, although attempts to remedy this situation were unsuccessful.

purchase natural steak and ground beef, are illustrated in Figures 4A & B and 5A & B, respectively. These represent a visual representation of how the included variables differ between the most likely customers and the full sample of respondents. For example, the most likely natural ground beef consumers are almost 50% less likely to be frequent beef consumers, while their ratings of several production attributes are almost one full ranking higher than those who are less likely to buy natural ground beef.

In the same manner, Table 3 contrasts the difference between the mean value of the consumer quintiles and the mean value for the entire sample, thereby showing how the mean for each explanatory factor differs among the market segments of potential consumers. In short, these classifications allow for a visual summary of variables that may assist in targeting prospective customers.

Respondents likely to purchase natural steak (segmented in quintiles IV and V) rated all attributes higher than the mean and the production attribute ratings were twenty-five percent greater than the sample mean. Natural beef consumption and some shopping at a natural food store were also more frequent. At the other extreme, respondents falling into steak's quintile I were older, ate beef more frequently, had smaller household sizes and rated all attributes lower than the entire sample.

Those most likely to purchase ground beef (quintiles IV and V) also rated production attributes higher, and had younger respondents than the full sample. Quintile IV had respondents that ate beef more frequently than the mean for the entire sample, more respondents with incomes between $30,000 and $75,000, more highly educated women and larger households. In quintile V respondents ate beef less frequently at home, had larger households and were more likely to have incomes greater than $30,000.

Marketing Implications and Conclusions

This study sought to characterize a market segment willing to pay a premium for natural beef. The segment was characterized both demographically and by which attributes of natural meats were identified as most important. This information is essential for marketing purposes, either for identifying retail stores with a customer base likely to be receptive to natural meat products and for formulating point-of-sale information to attract natural meat consumers.

The analysis defines an empirical model to identify consumers with a positive willingness to pay for natural beef and described market segments for those products. The market segments defined in the study describe consumer groups based on their probability of paying a premium. Reinforcing past studies, this research showed there are important differences across target market groups related to age, past meat shopping choices and income. Although the results were statistically insignificant, the relative high rations of target consumers suggest that attributes are important to varying degrees. The target groups most likely to purchase natural ground beef and steak at a premium also differed, suggesting that these were two distinct markets.

Information from the grocery industry (Janoff, 2000) indicated that the meat case is the most important product consumers consider when choosing a particular grocery outlet. The adoption of differentiated meat labeling, packaging and promotions is an avenue that can be exploited by the beef industry as they compete in an evolving retail food industry (Hauptman and Cavanaugh, 2001).

The target marketing results are valuable in describing potential consumers and how likely they will be to purchase natural beef. Concentrating on those consumers that

fall into the higher predicted probabilities (sixty to one hundred percent) for buying natural ground beef and steak provides market segment definitions that can provide valuable focus to marketing activities. This study also suggests that relatively young consumers with relatively high concern about production characteristics are the most likely to purchase differentiated products. Therefore, effective packaging may concentrate on the fact that grazing practices are not harmful to the environment or that hormone use is not permitted in the production practice.

Retailers also need to be educated about the supply limitations of niche-meat products, especially in the development phase of the relationship. Often, because of the volume driven nature of supermarket sales, the use of pricing strategies to manage demand is rejected without proper consideration (McKenzie, 2001). These results can be used to show how higher prices could restrict demand, thereby reducing the possibility of stock-outs. The pricing information presented graphically (Figures 2 and 3) outlines potential market shares based on willingness to pay premiums without information about expected individual purchase amounts. For steak, expected market share at a thirty percent premium is 12.8 percent and 21.2 percent for natural ground beef; a twenty percent premium for steak results in a 21.5 percent market share for steak. Further analysis of pricing information will be a focus of future research.

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Figure 1. Ranking of Production Attributes by Consumers

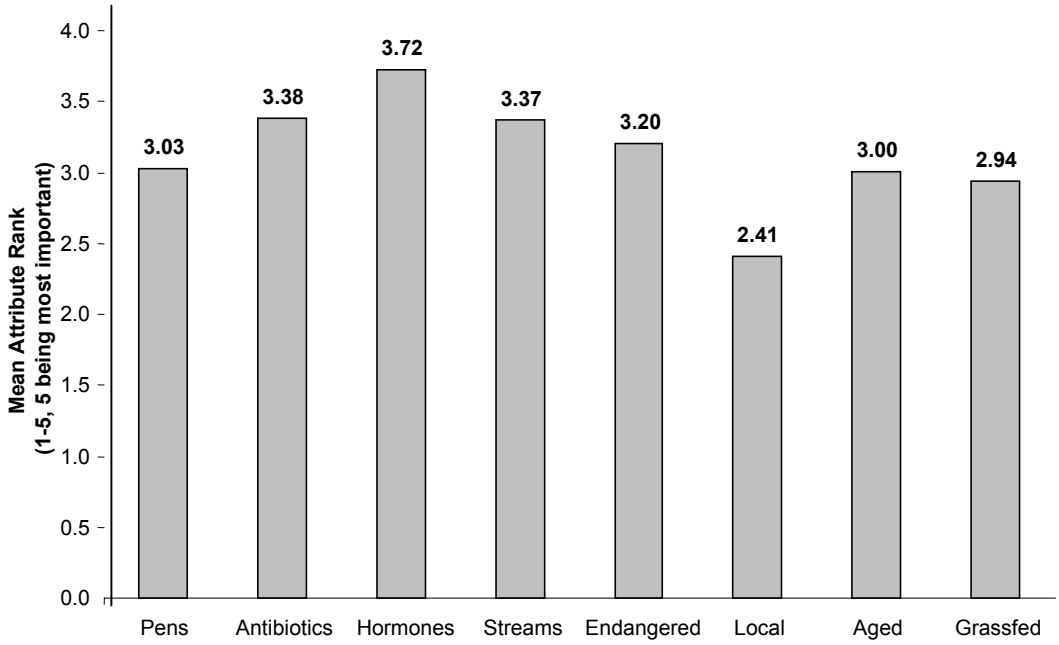

Figure 2. Share of Consumers Willing to Pay Various Premiums for Natural Ground

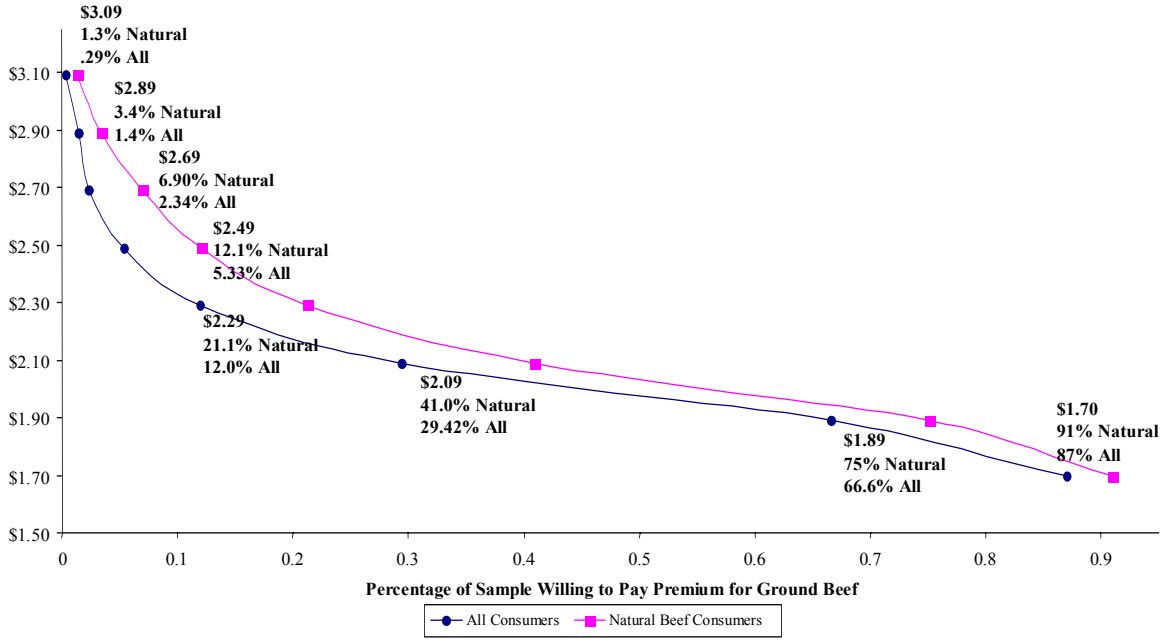

Figure 3. Share of Consumers Willing to Pay Various Premiums for Natural Steak

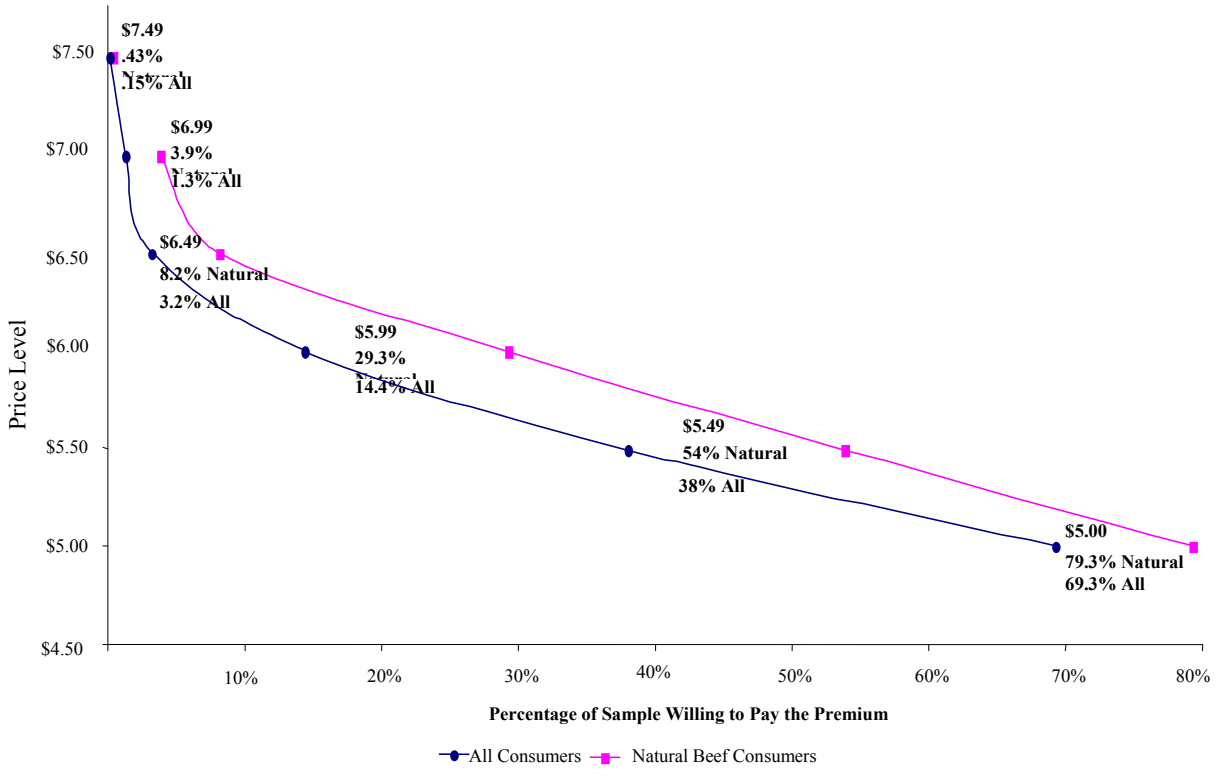

Figure 4A: Quintile V Natural Steak (n=135): Comparative Quintile Values

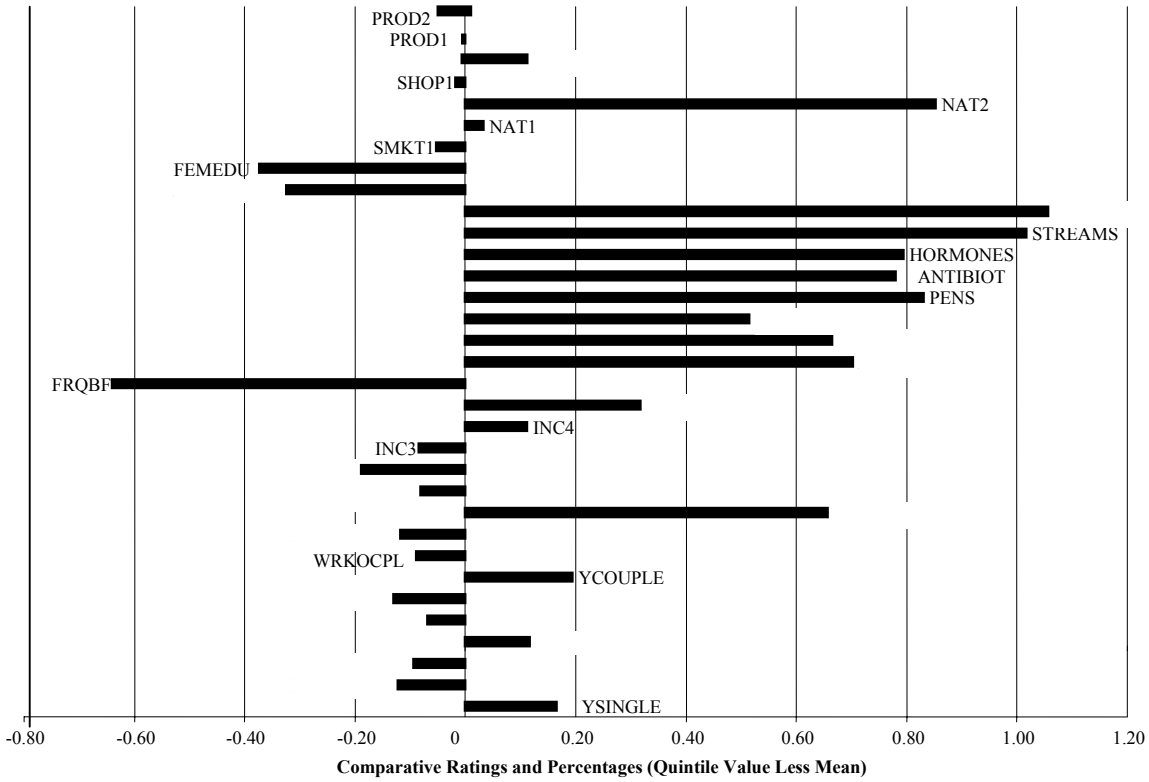

Figure 4B: Quintile IV Natural Steak (n=23): Comparative Quintile Values

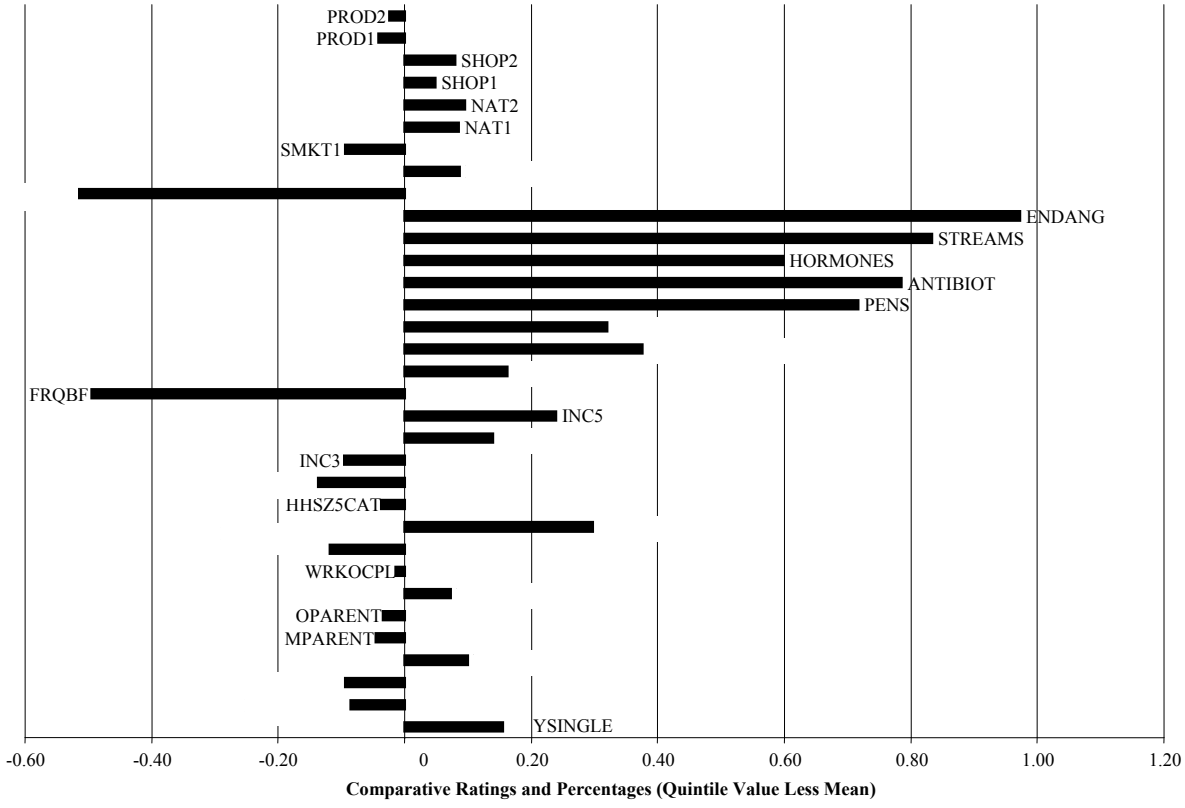

Figure 5A: Quintile V for Ground Beef (n=172): Comparative Mean Values

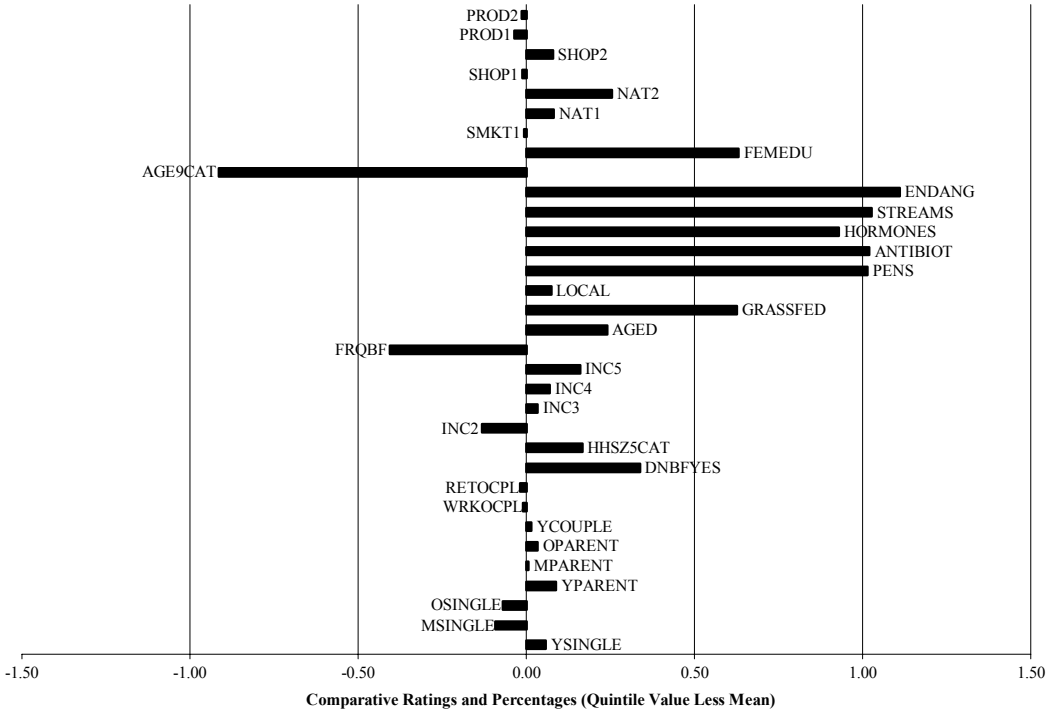

Figure 5B: Quintile IV for Ground Beef (n=825): Comparative Mean Values

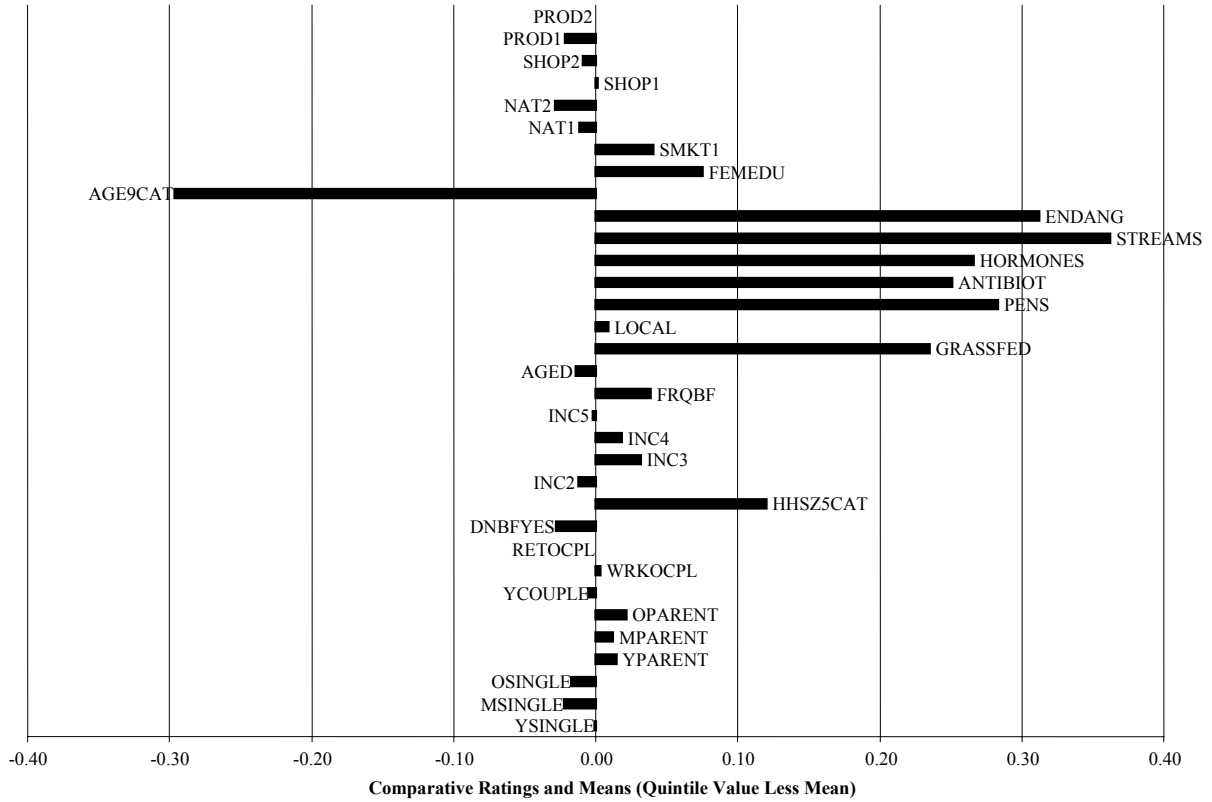

Table 1: Variable Descriptions and Means/Share

Variable	Mean/Share	Variable Description
		Demographics
YSINGLE	5.26%	Young Single, <35 (no children)
MSINGLE	12.26%	Middle Single, 35-65
OSINGLE	9.34%	Old Single, >65 (no children at home)
YPARENT	14.53%	Young Parent, <45, child <6
MPARENT	11.24%	Middle Parent, <45, child >6
OPARENT	12.99%	Older Parent, >45, any child
YCOUPLE	6.79%	Young Couple, <45, no children
WRKOCPL	13.21%	Working Old Couple, >45, no children
RETOCPL	11.75%	Retired Old couple, no children
HHSZ5CAT	2.385	Household size (1-5)
INC2	23.21%	$15,000-$30,000 annual income
INC3	25.77%	$30,000 - 50,000 annual income
INC4	19.34%	$50,000 - 75,000 annual income
INC5	16.13%	Greater than $75,000 annual income
AGE9CAT	4.67	Average age of respondent (1-9)
FEMEDU	3.76	Average education level (3= college, 4=graduate)
		Revealed Preference for Meat
DNBFYES	16.93%	One if bought natural beef in the past
FRQBF	3.162	Average beef meals eaten at home
		Attribute Ratings
AGED	2.993	Meat aged at least 14 days
GRASSFED	2.944	Grass Fed
LOCAL	2.399	Animal born and raised within 250 miles
PENS	3.039	No small or crowded pens
ANTIBIOT	3.393	No use of antibiotics
HORMONES	3.727	No use of growth hormones
STREAMS	3.374	Grazing managed to preserve streams
ENDANG	3.205	Grazing managed to protect endangered species
		Shopping Choices
SMKT1	87.88%	Most meat shopping at a supermarket
NAT1	1.17%	Most meat shopping at a natural foods store
NAT2	5.99%	Some meat shopping at a natural foods store
SHOP1	1.82%	Most meat shopping at a meat shop
SHOP2	14.31%	Some meat shopping at a meat shop
PROD1	4.82%	Most meat purchased direct from a producer
PROD2	6.06%	Some meat purchased direct from a producer

Table 2: Results of Logit Estimations on Ground Beef and Steak Equations

Variable	BUYGB				BUYSTK			
	Coefficient	T-ratio	P-value	Marginal Effects	Coefficient	T-ratio	P-value	Marginal Effects
CONSTANT	-1.052	-1.356	0.175	-0.229	-1.418*	-1.795	0.073	-0.329
YSINGLE	0.650	1.362	0.173	0.141	0.343	0.740	0.459	0.080
MSINGLE	0.187	0.446	0.655	0.041	-0.673	-1.596	0.110	-0.156
OSINGLE	0.429	0.976	0.329	0.093	-0.952*	-2.083	0.037	-0.221
YPARENT	0.585	1.045	0.296	0.127	-0.169	-0.306	0.759	-0.039
MPARENT	0.447	0.835	0.404	0.097	-0.689	-1.301	0.193	-0.160
OPARENT	0.589	1.206	0.228	0.128	-0.446	-0.921	0.357	-0.103
YCOUPLE	0.057	0.108	0.914	0.012	-0.493	-0.941	0.346	-0.114
WRKOCPL	0.160	0.350	0.727	0.035	-0.791*	-1.725	0.084	-0.183
RETOCPL	0.272	0.609	0.543	0.059	-0.973*	-2.164	0.030	-0.226
DNBFYES	0.258	1.426	0.154	0.056	0.451*	2.706	0.007	0.105
HHSZ5CAT	-0.131	-1.224	0.221	-0.029	-0.133	-1.296	0.195	-0.031
INC2	0.094	0.477	0.634	0.021	0.588*	2.591	0.010	0.136
INC3	0.447*	2.150	0.032	0.097	0.806*	3.487	0.000	0.187
INC4	0.483*	2.131	0.033	0.105	1.271*	5.179	0.000	0.295
INC5	0.634*	2.584	0.010	0.138	1.451*	5.570	0.000	0.337
FRQBF	-0.014	-0.279	0.780	-0.003	-0.023	-0.463	0.643	-0.005
AGED	0.035	0.658	0.510	0.008	0.025	0.471	0.637	0.006
GRASSFED	0.011	0.194	0.846	0.002	-0.020	-0.331	0.741	-0.005
LOCAL	-0.033	-0.603	0.547	-0.007	0.044	0.790	0.429	0.010
PENS	0.094	1.526	0.127	0.021	0.078	1.234	0.217	0.018
ANTIBIOT	0.053	0.815	0.415	0.012	0.088	1.302	0.193	0.020
HORMONES	0.017	0.243	0.808	0.004	-0.052	-0.711	0.477	-0.012
STREAMS	0.118	1.551	0.121	0.026	0.109	1.386	0.166	0.025
ENDANG	0.044	0.617	0.537	0.010	0.079	1.092	0.275	0.018
AGE9CAT	-0.073	-1.303	0.193	-0.016	-0.056	-0.997	0.319	-0.013
FEMEDU	0.041	1.467	0.142	0.009	0.006	0.196	0.845	0.001
SMKT1	0.512*	1.866	0.062	0.111	0.071	0.257	0.797	0.016
NAT1	1.089	1.337	0.181	0.237	0.407	0.652	0.514	0.094
NAT2	0.678*	2.169	0.030	0.148	0.703*	2.653	0.008	0.163
SHOP1	0.014	0.029	0.977	0.003	0.386	0.783	0.434	0.089
SHOP2	-0.042	-0.235	0.814	-0.009	0.127	0.743	0.457	0.030
PROD1	-0.185	-0.497	0.619	-0.040	-0.510	-1.305	0.192	-0.118
PROD2	-0.205	-0.811	0.417	-0.045	-0.450*	-1.736	0.082	-0.104
	Percent Predicted Correctly: 68.97%				Percent Predicted Correctly: 67.45%			

Table 3: Descriptive Statistics: A Comparison of the Full Sample and Predicted Market Segments

STEAK						
		Quintiles				
Variable	Full Sample Mean or Share	I: 0-20%	II: 20-40%	III: 40-60%	IV: 60-80%	V: 80-100%
YSINGLE	5.26%	0.00%	2.11%	6.32%	20.7%	21.74%
MSINGLE	12.26%	17.13%	16.34%	7.73%	3.7%	0.00%
OSINGLE	9.34%	38.43%	7.21%	0.94%	0.0%	0.00%
YPARENT	14.53%	1.85%	10.54%	22.48%	24.4%	26.09%
MPARENT	11.24%	9.26%	13.71%	10.77%	6.7%	4.35%
OPARENT	12.99%	5.56%	14.06%	17.10%	9.6%	0.00%
YCOUPLE	6.79%	1.39%	4.57%	9.13%	14.1%	26.09%
WRKOCPL	13.21%	8.33%	13.71%	15.93%	11.9%	4.35%
RETOCPL	11.75%	17.59%	16.52%	6.79%	0.0%	0.00%
DNBFYES	16.93%	2.78%	8.44%	22.48%	46.67%	82.61%
HHSZ5CAT	2.385	1.694	2.424	2.700	2.348	2.304
INC2	23.21%	22.22%	32.69%	16.39%	9.63%	4.35%
INC3	25.77%	12.96%	33.57%	25.29%	16.30%	17.39%
INC4	19.34%	2.31%	12.48%	32.08%	33.33%	30.43%
INC5	16.13%	0.00%	9.31%	24.12%	40.00%	47.83%
FRQBF	3.162	3.426	3.323	3.005	2.667	2.522
AGED	2.993	2.833	2.933	3.066	3.156	3.696
GRASSFED	2.944	2.347	2.953	3.080	3.319	3.609
LOCAL	2.399	2.157	2.316	2.501	2.719	2.913
PENS	3.039	2.130	2.946	3.351	3.756	3.870
ANTIBIOT	3.393	2.583	3.302	3.635	4.178	4.174
HORMONES	3.727	2.972	3.649	3.981	4.326	4.522
STREAMS	3.374	2.227	3.299	3.738	4.207	4.391
ENDANG	3.205	2.051	3.058	3.621	4.178	4.261
AGE9CAT	4.67	6.46	4.76	3.83	4.16	4.35
FEMEDU	3.76	3.50	3.83	3.80	3.85	3.39
SMKT1	87.88%	88.89%	89.10%	88.99%	78.52%	82.61%
NAT1	1.17%	0.00%	0.18%	0.23%	9.63%	4.35%
NAT2	5.99%	0.93%	0.53%	8.20%	15.56%	91.30%
SHOP1	1.82%	0.46%	1.23%	1.87%	6.67%	0.00%
SHOP2	14.31%	7.41%	11.07%	18.97%	22.22%	26.09%
PROD1	4.82%	9.26%	5.27%	3.28%	0.74%	4.35%
PROD2	6.06%	6.94%	7.73%	4.45%	3.70%	0.00%

*Shading denotes significance of the variable at the 10% level or below.

Table 3 (Continued): Descriptive Statistics: A Comparison of the Full Sample and Predicted Market Segments

GROUNDBEEF						
		Quintiles				
Variable	Full Sample Mean or Share	I: 0-20%	II: 20-40%	III: 40-60%	IV: 60-80%	V: 80-100%
YSINGLE	5.26%	0	0.00%	3.10%	5.2%	11.05%
MSINGLE	12.26%	0	18.75%	21.98%	10.0%	2.91%
OSINGLE	9.34%	0	31.25%	14.24%	7.6%	2.33%
YPARENT	14.53%	0	2.08%	8.05%	16.0%	23.26%
MPARENT	11.24%	0	4.17%	8.98%	12.5%	11.63%
OPARENT	12.99%	0	2.08%	7.43%	15.1%	16.28%
YCOUPLE	6.79%	0	6.25%	7.43%	6.3%	8.14%
WRKOCPL	13.21%	0	16.67%	12.38%	13.5%	12.21%
RETOCPL	11.75%	0	16.67%	12.07%	11.7%	9.88%
DNBFYES	16.93%	0	6.25%	7.74%	14.15%	50.58%
HHSZ5CAT	2.385	0	1.688	2.093	2.505	2.552
INC2	23.21%	0	29.17%	32.51%	22.01%	9.88%
INC3	25.77%	0	6.25%	18.89%	28.90%	29.07%
INC4	19.34%	0	6.25%	13.00%	21.16%	26.16%
INC5	16.13%	0	0.00%	10.53%	15.96%	31.98%
FRQBF	3.162	0	3.271	3.263	3.201	2.756
AGED	2.993	0	2.771	2.935	2.979	3.233
GRASSFED	2.944	0	0.938	2.307	3.179	3.570
LOCAL	2.399	0	2.208	2.365	2.408	2.471
PENS	3.039	0	0.521	2.149	3.322	4.052
ANTIBIOT	3.393	0	0.750	2.601	3.645	4.413
HORMONES	3.727	0	0.917	2.969	3.993	4.657
STREAMS	3.374	0	0.688	2.300	3.736	4.401
ENDANG	3.205	0	0.646	2.195	3.518	4.314
AGE9CAT	4.67	0	6.48	5.65	4.37	3.76
FEMEDU	3.76	0	3.02	3.35	3.84	4.40
SMKT1	87.88%	0	81.25%	78.95%	91.90%	87.21%
NAT1	1.17%	0	0.00%	0.00%	0.00%	9.30%
NAT2	5.99%	0	0.00%	0.62%	3.14%	31.40%
SHOP1	1.82%	0	0.00%	2.48%	1.93%	0.58%
SHOP2	14.31%	0	6.25%	13.62%	13.42%	22.09%
PROD1	4.82%	0	10.42%	11.46%	2.66%	1.16%
PROD2	6.06%	0	4.17%	7.12%	6.05%	4.65%

*Shading denotes significance of the variable at the 10% level or below.